of frosty days was nineteen in the winter of 1883-4, and there were fewer than thirty-five days with frost in the winters of 1845-6, 1850-1, 1858-9, 1862-3, 1865-6, 1876-7, 1881-2, 1883-4, 1895-6 and 1897-8. In the five out of the six months already elapsed of the present winter there have been twenty-one days with frost, and as yet the screened thermometer has not fallen below 23°·6. The winter (six months) with the lowest mean temperature at Greenwich is 1844-5, when the mean was 38°·8, and the winters with the mean below 40° were 1844-5, 1854-5, 1878-9, 1885-6, 1887-8 and 1890-1. The winter with the highest mean temperature was 1898-9, when the mean for the six months was 45°·4, and the mean for each of the six months, with the exception of March, was above the average. The winters with the mean temperature above 44° were 1845-6, 1847-8, 1848-9, 1862-3, 1876-7, 1883-4, 1897-8 and 1898-9. The mean for the five out of the six winter months already elapsed (1902-3) is 44°·6, so that it is most highly probable that the present winter will rank as one of the foremost for its general mildness.

Limiting the winter to a period of three months—December, January and February—the coldest winter in the last sixty years at Greenwich is 1890-1, with a mean temperature of 34°·3, or 5° below the average, and during this period the mean temperature for December was 29°·9, January 33°·9 and February 39°·1. The second coldest winter was 1846-7, with a mean of 34°·5, or 4°·8 below the average. In 1894-5 the mean temperature for the winter was 35°·1, or 4°·2 below the average, and February, 1895, with a mean temperature of 29°·3, was the coldest of any winter month since 1841, with the exception of 29°·2 in February, 1855, and during this month (February, 1895) frost occurred in the screen on twenty-three nights, the lowest shade temperature being 6°·9, and for six consecutive days the thermometer did not once rise above the freezing point. The warmest winter (three months) was 1868-9, with a mean of 44°·4, or 5°·1 above the average. The second warmest winter was 1876-7, with a mean of 43°·7, which is 4°·4 above the average. The winters (December to February) with the mean 3° or more below the average are 1844-5, 1846-7, 1854-5, 1864-5, 1878-9, 1879-80, 1885-6, 1890-1, 1894-5. The winters with the mean 3° or more above the average are 1845-6, 1848-9, 1862-3, 1865-6, 1868-9, 1876-7, 1898-9, and the present winter, 1902-3, when the mean temperature was 3°·1 above the average. The mean temperature of February, 1903, was 45°·3, which is the warmest since 1869, and it was 16° warmer than 1855 and 1895. February had been cold for the previous three years, and it seemed probable that it would have been so this year, but experience has proved otherwise. At the commencement of the present winter, it was pretty confidently believed by many meteorologists that the winter would be severe, but such a belief has proved a most complete failure. It is, however, hoped that in the somewhat near future long period weather forecasts may be attempted. At present the forecaster is bound to admit his utter inability to form anything like an accurate estimate of our coming weather in England for more than twenty-four hours in advance, except when we are experiencing pronounced cyclonic or anticyclonic conditions, when we may with fair safety venture an opinion for, say, a week. The absolutely lowest winter temperatures at Greenwich (below 10°) are 4°·0 January 9, 1841; 7°·7 February 12, 1845; 8°·0 December 25, 1860; 6°·6 January 5, 1867; 9°·8 December 25, 1870; and 6°·9 February 8, 1895. The absolutely highest temperatures in each of the three winter months are December, 1848, 62°·4; January, 1843, 57°·0; February, 1846, 62°·3; 1868, 61°·7; 1869, 61°·6; 1878, 60°·5; 1891, 62°·1; 1899, 63°·9. The winter of 1885-6 was severe and very prolonged, and it is apparently the only winter with skating on the waters around London in each of the four months December to March.

The average rainfall at Greenwich for the winter six months for the last sixty years is 11·82 inches, and the winters with the aggregate rainfall in excess of 14 inches are 1852-3, 1865-6, 1868-9, 1872-3, 1876-7, 1880-1, 1882-3, 1896-7, 1899-1900. The wettest winter of the whole series was 1876-7, with an aggregate rainfall of 18·72 inches. The driest winters, with a rainfall below 8 inches, were 1858-9, 1873-4, 1879-80, 1890-1 and 1897-8. The driest winter was 1879-80, with a total rainfall of 5·54 inches. The aggregate rainfall for five out of the six winter months of the winter 1902-3 is 7·3 inches, which is 4·5 inches less than the average for the six months during the last sixty years, and it is exceedingly improbable that the whole winter (October to March) will prove to be wet. Only two years have been wet at Greenwich out of the last fourteen years, but seven of the last fourteen winters have been wet, and ten of the last fourteen Decembers have been wet. The tail end of the present winter is proving very stormy, and for their destructive character the recent gales, as shown by the publications of the Meteorological Office, seem likely to prove as generally disastrous as any experienced for a long time past.

CHAS. HARDING.

A UNIQUE VARIABLE STAR.

MESSRS. MÜLLER and Kempf, of the Astrophysical Observatory of Potsdam, have recently announced the discovery of a variable star of so short a period that it must take a unique position among this class of phenomena. Up to this time the variables which went through a complete cycle of their light phases in the shortest time were those two stars situated in the rich star cluster ω Centauri; these bodies completed their periods in 7h. 11·4m. and 7h. 42·8m. Another variable running these rather close is that of S. Antliæ, the period of which is 7h. 46·8m. The new variable is, however, of a much shorter period than any of these, nearly one-half as short, occupying only four hours and a few seconds to complete its light changes.

The discoverers of this variable had their attention first brought to this object in their work on the photometric survey, in which it was noticed that there was a great difference between two measures of this star (B.D. + 56°1400, R.A. = 9h. 36m. 44s., Decl. + 56° 24′·6, 1900) that exceeded the usual error of observation. A closer examination of the star itself was then undertaken, and a series of observations extending over the year 1902, and part of this year, was made. The account of this research, recently published (*Sitz. Ber. der K. Preuss. Ak. der Wiss.*, February 5, 1903, vii.), gives the details of the observations and the conclusions arrived at.

The diagram accompanying the paper shows that the light-changes at an epoch of minimum vary very quickly, the curve being quite pointed at these times. From minimum to maximum the light changes at rather a slower rate than from maximum to minimum, and at about maximum the star apparently changes its magnitude very little, so that the exact epoch of the maximum is not so easy to determine as that of the minimum. During these changes the magnitude varies from 8·58 to 7·9, and the length of the period, as at present determined, is 4h. 0m. 12·8s., with an error, as stated, of probably about 0·5s. For computing the times of minima the following equation is given :—

Min. = 1903 January 14, 4h. 32m. (Greenwich mean time) + 4h. 0m. 12·8s. E.

The discoverers suggest that the hypothesis of stellar variability, which best seems to explain this light curve, is that which involves two bright bodies revolving at a small distance round their centre of gravity, the plane of revolution being nearly in the line of sight. It will be interesting, therefore, to examine this variable spectroscopically and see whether the spectrum changes and if so in what manner.

WILLIAM J. S. LOCKYER.

NOTES.

THE French Congress of Scientific Societies will hold its forty-first annual meeting at Bordeaux on April 14–18.

THE deaths are announced of Prof. C. Dufour, professor of astronomy at the University of Lausanne, and of Prof. René Mamert, professor of chemistry at the University of Freiberg.

IT is announced in *Science* that Prof. George B. Shattuck, professor of physiographic geology of the Johns Hopkins University, has been authorised to organise an expedition for a systematic scientific survey of the Bahama Islands.

THE executive committee of the Carnegie Institution has approved a grant of 300*l.* to Mr. G. R. Wieland, of the Yale University Museum, for the continuation during the year 1903 of his researches on the structure of the living and fossil cycads.

PROF. J. B. TINGLE, professor of chemistry at Illinois College, Jacksonville, Ill., has received a grant of 100*l.* from the Carnegie Institution to enable him to continue his investigations of derivatives of camphor and allied compounds.

THE Academy of Sciences at Berlin has made grants of 200*l.* to Prof. Landolt and of 150*l.* to Dr. Marckwald, both of Berlin, for work in chemistry; of 100*l.* to Dr. Danneberg, of Aachen, for work in mineralogy; and of 80*l.* to Prof. Kobert, of Rostock, for work in pharmacology.

THE council of the Iron and Steel Institute has resolved to award the Bessemer gold medal for this year to Sir James Kitson, M.P., past-president, in recognition of his great services to the iron and steel industry of Great Britain. The presentation of the medal will be made by Mr. Andrew Carnegie at the annual meeting on May 7.

THE Paris Natural History Museum has received a gift of an important collection of Lepidoptera, containing about twenty thousand specimens, from M. E. Boullet. The donor desires that his collection be incorporated with the specimens already possessed by the Museum, so that in this way a series worthy of the Paris museum may be formed.

THE Lucy Wharton Drexel medal of the University of Pennsylvania has been presented to Prof. F. W. Putnam. The medal was established four years ago, but no awards were made until this year, when four were awarded at one time, the other recipients being Prof. Petrie, for his work at Abydos; Dr. Evans, for his excavations at Crete; and Prof. Hilprecht, for work in Babylonia.

WE learn from *Science* that the Bill creating a department of commerce in the United States, with a secretary in the Cabinet, has passed the House and Senate. The new department will include, with other departments, the Lighthouse Board, the Lighthouse Establishment, the Bureau of Navigation, the Bureau of Standards, the Coast and Geodetic Survey and the Bureau of Foreign Commerce (now in the Department of State).

IT was reported last week that Vesuvius was in eruption. The following messages have since been received:—Wednesday, March 11.—Eruption increased in intensity. Huge columns of vapour emitted from the crater with blocks of incandescent lava. Friday, March 13.—Eruption continues, but with decreased intensity. Two rents have opened in the central crater, and from these molten lava and pumice are ejected at half-minute intervals. The bombs are sometimes thrown to a height of 1000 feet.

A DIVISION OF HYDROLOGY has recently been added to the Hydrographic Branch of the United States Geological Survey. The work of the division will include the gathering and filing of well records of all kinds, the study of artesian and other problems relating to underground waters, and the investigation of the stratigraphy of the water-bearing and associated rocks. In addition to the gathering of statistics relating to the flow, cost, &c., of the wells, it is hoped in the future to give especial attention to the geological features which govern, or which are related in any way to, the supply of water.

M. BIALYNITSKY-BIROULIN, the zoologist of Baron Toll's Arctic expedition, has stated to the Irkutsk branch of the Russian Imperial Geographical Society that Baron Toll left the yacht *Sarja* on June 9 on the islands of the north coast and proceeded to Cape Wyssoki, where he arrived on July 10. Here he deposited a statement to the effect that all was well with him and his followers, and that the dogs were in good condition. Baron Toll started for Bennett Land on July 13 with three sleighs and forty-five dogs. If a passage through the ice to the *Sarja* should not be open, M. Biroulin says that Baron Toll intended wintering in Bennett Land.

THE fourth annual general meeting of the National Association for the Prevention of Consumption and other forms of tuberculosis was held on Tuesday. Lord Derby occupied the chair, and in moving the adoption of the report, he referred to the interest which was taken by foreign countries through communication with the association in connection with the International Bureau. The report showed that the death rate from tuberculosis in Prussia had decreased since 1886, and, although a decrease had occurred in England, and the death rate was still lower than that of Germany, the decrease had not been so great as that in Prussia. The council expressed the opinion that the greater drop in the death rate from tuberculosis in Prussia was due to the widespread knowledge of tuberculosis, the preventive measures taken in that country, and the large number of sanatoria established during recent years. In Germany the individual was taken care of, and was watched by the State through all periods of the existence of the disease.

A REUTER telegram from Vienna states that Prof. Hanos Molisch, of Prague, "has reported to the Vienna Academy of Sciences the discovery of a lamp lighted by means of bacteria." It will be remembered that, at the Royal Society conversazione in May, 1901, Mr. J. E. Barnard and Dr. Allan Macfadyen exhibited several striking experiments with luminous bacteria from the bacteriological laboratory of the Jenner Institute of Preventive Medicine. A year ago (April 10, 1902) Mr. Barnard contributed an account of luminous bacteria to these columns, and his remarks were illustrated by reproductions of cultures of these organisms. Prof. Molisch's lamp would seem to offer another instance of the industrial application of the results of research in pure science. According to the Reuter message, "the lamp consists of a glass vessel, in which a lining of saltpetre and gelatine inoculated with bacteria is placed. Two days